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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,921	03/30/2004	Hiromitsu Yamakawa	25-274	3168

7590 05/31/2006

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EXAMINER	
PHAM, HAI CHI	

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/811,921	YAMAKAWA, HIROMITSU	
	Examiner	Art Unit	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *03/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 3-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 3 does not clearly set forth the metes and bounds of the claimed invention by claiming a set of components "in combination". The scope of the claim with respect to what unrecited additional components, if any, would be excluded from the scope of the claim. However, dependent claim 4 introduces additional components to the combination as claimed in the parent claim, and thereby rendering the scope of the claims unascertainable.

Claims 7-8, 11-12, 15-16, 18 and 20 are dependent from claims 3 and 4 above, and are therefore indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, 5-6, 9-10, 13-14, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomiyama (JP 2000-249915) in view of Harris (U.S. 5,486,694)

Nomiyama, an acknowledged prior art, discloses a laser array imaging lens comprising, in order from a light-source side, without any intervening lens component, a first lens component (first scanning lens 41) and a second lens component (second scanning lens 42), one lens surface of which is aspheric (the second scanning lens 42 having an aspheric surface), wherein at least one lens surface of the laser array imaging lens is formed with an anamorphic, aspheric surface (either first or second scanning lens 41, 42 is an anamorphic aspherical lens) (English translation, paragraph [0013]).

Nomiyama fails to teach at least one lens surface of the laser array imaging lens having a diffractive optical element with a phase function either superimposed thereon or is provided as a separate surface.

Harris discloses in Fig. 9 an imaging lens system (300), which combines a refractive toric lens (304), as a second imaging lens, and a binary diffractive optical lens (302), as a first imaging lens, whose diffractive surface having a multi-level structure,

which possesses a diffractive phase function to flatten the field curvature of the cross-scan imaging lens (see Abstract and col. 8, line 61 to col. 9, line 2).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide at least one of the scanning lenses of Nomiyama with a multi-level structure diffractive surface having a diffractive phase function as taught by Harris. The motivation for doing so would have been to flatten the field curvature of the cross-scan imaging lens as suggested by Harris.

Nomiyama further teaches:

- a stop is positioned on the image-plane side of the first lens component at a specified distance (a stop 43 is located between the first scanning lens 41 and the photoreceptor drum 3, the distance between the exit surface of the first scanning lens 41 and the stop 43 is indicated by the Table 1 as being 72.002 mm) (Fig. 1) (English translation, paragraph [0015]),
- a laser array light source (semiconductor laser array 2) made by arraying multiple light emitting elements in one or more rows and means (laser actuation circuit 8) for independently modulating the individual light emitting elements of the laser array light source, based on a prescribed signal (the semiconductor laser array 2 having light emitting elements arranged in a two-dimensional array and independently driven based on the image data stored in the image memory 6), means (drum driving gear 5) for relatively moving a surface to be scanned, that is positioned substantially at an image surface of the laser array imaging lens, in a sub-scanning direction that is roughly perpendicular to the direction of the image

dots that form one or more rows at the image surface (the drum driving gear 5 rotating the drum 3 in the sub-scanning direction perpendicular to the main scanning direction showing as a row across the surface of the drum 3) (English translation [0009]),

- the first lens component consists of a single lens element (the first scanning lens 41 is a single lens component) (Fig. 1),
- the stop is positioned so that the laser array imaging lens is substantially telecentric on the light-source side (see Abstract).

6. Claims 3-4, 7-8, 11-12, 15-16, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomiyama in view of Imakawa et al. (U.S. 5,671,077).

Nomiyama discloses a laser array imaging lens comprising, in order from a light-source side, without any intervening lens component, a first lens component (first scanning lens 41) and a second lens component (second scanning lens 42), one lens surface of which is aspheric (the second scanning lens 42 having an aspheric surface), wherein at least one lens surface of the laser array imaging lens is formed with an anamorphic, aspheric surface (either first or second scanning lens 41, 42 is an anamorphic aspherical lens) (English translation, paragraph [0013]).

Nomiyama fails to teach the condition that binds the distance L from the laser array light source to the light-source-side surface of the first lens component of the laser array imaging lens, the distance D_{21} from the image-plane-side surface of the first lens

component to the position where the central rays of the beams from the laser elements intersect the optical axis and the image magnification M.

Imakawa et al. discloses an anamorphic lens (21) being used to focus a laser beam onto the receiving surface of a sensor, the anamorphic lens is disposed at a certain distance from the laser light source such that the converging light beam is focused at the surface of the sensor in accordance with the magnification of the optical system and the distance from the image-plane-side surface of the anamorphic lens to the position where the central rays of the beams from the laser elements intersect the optical axis, e.g. at the surface plane of the sensor. In order to obtain such condition, Imakawa et al. sets the distance d_o from the light emitting surface of the light source to the light-source side of the anamorhpic lens (21) as $d_o = 6.667$mm, the distance d_2 between the second surface of the anamorphic lens and the light receiving surface as $d_2 = 18$mm, and the magnification m = 3 (see Example 5 at col. 15) such that:

$$d_o / d_2 \times (1 - 1/m) = 6.667 / 18 (1 - 1/3) = 0.55558$$

which amply meets the claimed condition.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to dispose the anamorphic lens of Nomiyama at a distance from the light source in accordance with the magnification of the optical system and the distance from the image-plane-side surface of the anamorphic lens to the position where the central rays of the beams from the laser elements intersect the optical axis as taught by Imakawa et al. The motivation for doing so would have been to

maintain a desired light amount and beam diameter at the converging point of the light beam as suggested by Imakawa et al.

Nomiyama further teaches:

- a stop is positioned on the image-plane side of the first lens component at a specified distance (a stop 43 is located between the first scanning lens 41 and the photoreceptor drum 3, the distance between the exit surface of the first scanning lens 41 and the stop 43 is indicated by the Table 1 as being 72.002 mm) (Fig. 1) (English translation, paragraph [0015]),
- a laser array light source (semiconductor laser array 2) made by arraying multiple light emitting elements in one or more rows and means (laser actuation circuit 8) for independently modulating the individual light emitting elements of the laser array light source, based on a prescribed signal (the semiconductor laser array 2 having light emitting elements arranged in a two-dimensional array and independently driven based on the image data stored in the image memory 6), means (drum driving gear 5) for relatively moving a surface to be scanned, that is positioned substantially at an image surface of the laser array imaging lens, in a sub-scanning direction that is roughly perpendicular to the direction of the image dots that form one or more rows at the image surface (the drum driving gear 5 rotating the drum 3 in the sub-scanning direction perpendicular to the main scanning direction showing as a row across the surface of the drum 3) (English translation [0009]),

- the first lens component consists of a single lens element (the first scanning lens 41 is a single lens component) (Fig. 1),
- the stop is positioned so that the laser array imaging lens is substantially telecentric on the light-source side (see Abstract).

Pertinent Prior Art

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Iizuka et al. (U.S. 6,954,222) discloses a scanning optical system including a first scanning lens having an anamorphic aspherical surface and a second scanning lens having an aspherical surface.

Kimura (U.S. 6,885,486) discloses a scanning optical system of an image forming apparatus, the system including a first and a second scanning lens, each having an aspherical surface, and a fine structural diffractive grating on its surfaces.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hai Phan

HAI PHAM
PRIMARY EXAMINER

May 30, 2006